PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

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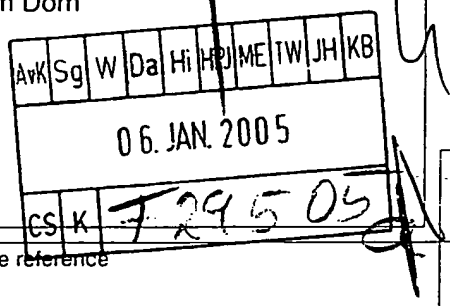
ALLEMAGNE



NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing *(day/month/year)*	04.01.2005
Applicant's or agent's file reference	**IMPORTANT NOTIFICATION**
032631wo HPJ/ko	

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP 03/13222	25.11.2003	29.11.2002

Applicant
CROMPTON GMBH et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:	Authorized Officer
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
032631wo HPJ/ko		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP 03/13222	25.11.2003	29.11.2002
International Patent Classification (IPC) or both national classification and IPC		
C07C67/08		
Applicant		
CROMPTON GMBH et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
05.05.2004	04.01.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Breimaier, W Telephone No. +49 89 2399-8327

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/13222

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-34 as originally filed

Claims, Numbers

1-19 received on 14.12.2004 with letter of 08.12.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-17
	No:	Claims	18, 19
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-17
Industrial applicability (IA)	Yes:	Claims	1-19
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

D1 : US-A 0052462
D2 : Pat. Abstr. Jp., JP-A 06248060, cited on page 1, line 11

clarity (Art. 6 PCT) Claim 1 on file is not clear because the subject-matter as claimed embraces compounds which do not exist, in particular the attention is drawn to formulae II to IV with X=P (for example formula (II) with m, n=1 defines the compound "PMe").

novelty

a. The subject-matter according to claims 1 to 17 is novel in the sense of Art. 33(2) PCT.

None of the documents of the available prior art discloses catalytic compositions as claimed in claim 1. D1 as well as D2 describe the formation of polyesters useful for eg films having good mechanical properties, good color tone and excellent thermal stability in the presence of a catalytic composition composed of a Sn catalyst and a phosphorus compound (see D1, parapraph [0064-0067, 0079, 0093, claims 1, 3] and D2 with Sn/HMPA).
Thus, claims 1 to 17 are novel.

b. The subject-matter according to claims 18 and 19 is not novel in the sense of Art. 33(2) PCT.

A product-by-process claim is interpreted as a claim directed to the procuct per se, since the reference to the production serves only the purpose of defining the subject-matter for which protection is sought, which remains the product per se which itself must be new and inventive. To establish novelty, it is necessary that the modification of the preparation process results in other products, i.e. in products unambiguously showing distinct physical/chemical properties vis-à-vis the closest state of the art products of D1. This requirement is at present not fulfilled by the application as it stands and novelty cannot be acknowledged.

inventive step

The subject-matter according to claims 1 to 17 seems not to be inventive (Art. 33(3) PCT).

In view of the closest state of the art D1, the problem posed is the provision of better catalytic compositions suitable for catalyzing esterifications etc for making polyesters. This problem is solved by the catalytic compositions according to claim 1 with X=P. In the examples catalytic compositions containing a Sn catalyst and a phosphorous compound as co-catalyst have been tested (see catalytic mixtures a) to g), table 1). However, no better effect is shown versus the catalytic composition known from D1 (see [0065], lines 8 and 9 and [0068]) which is considered to be structurally close with the claimed Sn-compositions containing a compound II with X=P. In the absence of these data, an inventive step cannot be assessed.

In the case of providing alternative catalytic Sn-compositions containing a compound II with X=N, Si, Cl, Br, I or S it is noted that at present no experimental data are available which would show that these catalytic compositions indeed solve the problem posed. Thus, in the absence of experimental data over the whole area as claimed, an inventive step cannot be assessed.

further remarks

a. The document D1 is not cited in the description.

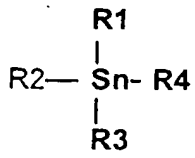
b. The description is not adapted to the claims.

PCT/EP03/13222 HPJ/RC/ko 08 December 2004

Crompton GmbH

C L A I M S:

1. Catalytic composition for esterification, transesterification and polycondensation reactions containing a mixture of at least one organotin compound (compound I) of the general formula (I):



(formula I)

wherein

- R1 is selected from the group of linear, branched or cyclic alkyl groups having 1 to 40 carbon atoms, aryl groups having 1 to 40 carbon atoms, or substituents selected from the group: -X-R^A, wherein R^A is -CN, -COOH, -COO-methyl, -COO-ethyl, -COO-n-propyl, -COO-iso-propyl, -COO-n-butyl, -COO-2-butyl, -COO-iso-butyl, -COO-tert-butyl, -COO-n-pentyl, -COO-isopentyl, -COO-neo-pentyl, -COO-tert-pentyl, -COO-hexyl, -COO-heptyl, -COO-n-octyl, -COO-iso-octyl, -COO-2-ethyl-1-hexyl, -COO-2,2,4-trimethylpentyl, -COO-nonyl, -COO-decyl, -COO-dodecyl, -COO-n-dodecyl, -COO-cyclopentyl, -COO-cyclohexyl, -COO-cycloheptyl, -COO-methylcyclohexyl, -COO-vinyl, -COO-1-propenyl, -COO-2-propenyl, -COO-naphtyl, -COO-anthranyl, -COO-phenanthryl, -COO-o-tolyl, -COO-p-tolyl, -COO-m-tolyl, -COO-tolyl, -COO-ethylphenyl, -COO-mesityl, -COO-benzyl, -COO-phenyl, $-COOC_2H_4OH$, $-COOC_3H_6OH$, $-COOC_4H_8OH$, $-COOCH_2C(CH_3)_2CH_2OH$; and -X- is $-CH_2-$, $-C_2H_4-$, $-C_3H_6-$, $-C_4H_8-$, $-C_5H_{10}-$, or $-C_6H_{12}-$;
- R2 is selected from the groups of linear, branched or cyclic alkyl groups having 1 to 40 carbon atoms, aryl groups having 1 to 40 carbon atoms and anionic ligands with O-coordination of the group selected from -O, -OH, linear, branched or cyclic alkyl or arylcarboxy groups having 1 to 40 carbon atoms, linear, branched or cyclic alkyl-, and aryl alcoholate groups having 1 to 40 carbon atoms;

- R3 and R4 independently each are selected from the groups of anionic ligands with O-coordination of the group selected from -O, -OH, linear, branched or cyclic alkyl groups or arylcarboxy groups having 1 to 40 carbon atoms, linear, branched or cyclic alkyl-, and aryl alcoholate groups having 1 to 40 carbon atoms and anions of a mineral acid selected from the group of sulphate, sulphite, phosphate, halogen- or pseudohalogen anion

and at least one compound (compound II) according to one of the formulae (II), (III) and/or (IV),

$X_m(R')_n$ (Formula II)

$O=X_m(R')_o$ (Formula III)

$(O=)_rX_mO_p(R')_q$ (Formula IV)

wherein X is a heteroatom selected from the group consisting of N, Si, Cl, Br, I or S, and

- m is an integer from 1 to 5,
- n is an integer from 1 to 5,
- o is an integer from 1 to 5,
- p is an integer from 0 to 5,
- q is an integer from 0 to 5,
- r is an integer from 0 to 3, wherein
- R' in formula (II) denotes n different or identical groups, each being independent from each other selected from the group of linear, branched or cyclic alkyl groups having 1 to 40 carbon atoms, aryl groups having 1 to 40 carbon atoms, anionic ligands with O-coordination selected from the group of -O, -OH, linear, branched or cyclic alkyl-, and aryl alcoholate groups having 1 to 40 carbon atoms, H, Cl, Br, NH_4^+ or a metal ion,
- R' in formula (III) denotes o different or identical groups, each being independent from each other selected from the group of linear, branched or cyclic alkyl groups having 1 to 40 carbon atoms, aryl groups having 1 to 40, anionic ligands

with O-coordination selected from the group of -O, -OH, linear, branched or cyclic alkyl-, and arylalcoholate groups having 1 to 40 carbon atoms, H, Cl, Br, NH_4^+ or a metal ion,

R' in formula (IV) denotes q different or identical groups, each being independent from each other selected from the group of linear, branched or cyclic alkyl groups having 1 to 40 carbon atoms, aryl groups having 1 to 40, anionic ligands with O-coordination selected from the group of -O, -OH, linear, branched or cyclic alkyl-, and arylalcoholate groups having 1 to 40 carbon atoms, H, Cl, Br, NH_4^+ or a metal ion,

or wherein X is P and

- **m is an integer from 1 to 5,**
- **n is an integer from 1 to 5,**
- **o is an integer from 1 to 5,**
- **p is an integer from 0 to 5,**
- **q is an integer from 0 to 5,**
- **r is an integer from 0 to 3, wherein**
- **R' in formula (II) denotes n different or identical groups, each being independent from each other selected from the group of linear, branched or cyclic alkyl groups having 1 to 40 carbon atoms, aryl groups having 1 to 40 carbon atoms, anionic ligands with O-coordination selected from the group of -O, -OH, linear, branched or cyclic alkyl-, and aryl alcoholate groups having 1 to 40 carbon atoms, H, Cl, Br, NH_4^+ or a metal ion,**
- **R' in formula (III) denotes o different or identical groups, each being independent from each other selected from the group of linear, branched or cyclic alkyl groups having 1 to 40 carbon atoms, aryl groups having 1 to 40, anionic ligands with O-coordination selected from the group of -O, linear, branched or cyclic alkyl-, and arylalcoholate groups having 1 to 40 carbon atoms, H, Cl, Br, NH_4^+ or a metal ion,**

R` in formula (IV) denotes q different or identical groups, each being independent from each other selected from the group of linear, branched or cyclic alkyl groups having 1 to 40 carbon atoms, aryl groups having 1 to 40, anionic ligands with O-coordination selected from the group of -O, linear, branched or cyclic alkyl-, and arylalcoholate groups having 1 to 40 carbon atoms, H, Cl, Br, NH_4^+ or a metal ion.

2. Catalytic composition according to claim 1, characterized in that the metal ion is selected from NH_4, Li, Na, K, Rb, Cs, Mg, Ca, Sr, Ba, Zn, B, Al, Sc, Y.

3. Catalytic composition according to claim 1, characterized in that compound II corresponds to phosphites, phosphines, phosphonic acid esters, pyrophosphates, alkaline halogenides, earth alkaline halogenides, aluminum halogenides.

4. Catalytic composition according to any one of claims 1 to 3 characterized in that the molar ratio of said compound I to said compound II is in the range of 1:0.001 to 1:200, in particular 1:0,01 to 1:20.

5. Catalytic composition according to any one of claims 1 to 4, further containing suspension agents or solvents.

6. Process for the continuous or batchwise catalysis of esterification, transesterification, polyesterification, polytransesterification reactions of an alcohol and an acid or acid derivative, such as an ester, anhydride or halogenide, characterized by employing a catalytic composition according to any one of claims 1 to 5.

7. Process according to claim 6, characterized by employing an amount of said compound I in the range of 0.1 to 1 % by weight (as Sn), in particular 10 to 200 ppm (as Sn) in relation to the acid or ester to be reacted.

8. Process according to claim 6 or 7, characterized by employing a concentration of said compound II in the range of 0.0001 ppm to 1% by weight, in particular 10 to 200 ppm in relation to the acid or ester to be reacted.

9. Process according to any of claims 6 to 8, characterized by reacting a dicarboxylic acid or a dicarboxylic acid derivative with a divalent alcohol in a polyesterification reaction.

10. Process according to any one of claims 6 to 8, characterized by employing derivatives of mono-, di, or polycarboxylic acids being selected from esters or halogenides.

11. Process according to any one of claims 6 to 10, characterized by reacting hydroxycarboxylic acids or derivatives of hydroxycarboxylic acids in an esterification, transesterification, polyesterification or polytransesterification reaction.

12. Process according to claim 11, characterized by employing derivatives of hydroxycarboxylic acids being selected from esters or ethers.

13. Process according to any one of claims 6 to 12, characterized by employing a solvent or suspending agent being added to said compound I and/or II .

14. Process according to claim 13, characterized by employing an alkane mono-, di- or polyvalent alcohol as solvent or suspending agent.

15. Process according to anyone of claims 6 to 14, characterized by employing the same solvent and/or suspending agent during manufacturing of the catalytic composition and said esterification, transesterification, polyesterification or polytransesterification reaction.

16. Process according to anyone of claims 6 to 15, characterized by employing a different solvent and/or suspending agent during manufacturing of the catalytic composition and said esterification, transesterification, polyesterification or poly-transesterification reaction.

17. Process according to claims 14 or 15, characterized by employing a solvent being selected from the group of mono-, di- or polyvalent alcohols being reacted in said esterification, transesterification, polyesterification or polytransesterification reaction.

18. Polyester for bottles, films, foils, yarn and/or molded padding, or resins for powder coatings or technical synthetic materials, obtainable by a process according to any one of claims 6 to 17.

19. Polyester or resins according to claim 18, wherein said polyester is selected from the group of polyethylene terephthalate, poly-2,2-dimethylpropyl-1,3-terephthalate, polypropylene terephthalate, polydiethyleneglycol terephthalate, polybutylene terephthalate, polynaphthalene terephthalate, or polyethylene naphthalate.